

# National action plan on antimicrobial resistance in India: A call to action



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## Letter to the Editors

The G20, often regarded as the premier platform for global economic collaboration, assumes a pivotal role in influencing and fortifying the worldwide framework and administration of critical international economic matters. India has taken on the G20 Presidency, serving from December 1, 2022, to November 30, 2023. India has chosen the theme “One Earth, One Family, One Future” for its G20 Presidency. This theme reflects India’s commitment to working with other G20 members to create a more inclusive, sustainable, and resilient future for all. The leaders of G20 met in New Delhi on September 9-10, 2023, under the theme “Vasudhaiva Kutumbakam” and have declared action plans in every field to accelerate sustainable development. In the area of healthcare, The G20 declaration envisions building equitable, resilient, sustainable, and inclusive health systems. The one-health-based joint plan of action, the holistic and systems-based approach that identifies the interconnection between the health of humans, animals, plants, and the environment, stands as a backbone for all the action plans (Mackenzie & Jeggo, 2019).

The issue of antimicrobial resistance (AMR) is brought to the forefront within the one-health approach. AMR has effects on people, animals, and the environment. AMR limits the effectiveness of antibiotics and other antimicrobial drugs, making it more challenging to treat infections in humans and animals. This can lead to longer illness durations, increased healthcare costs, and higher mortality rates. The main rationale for incorporating environmental considerations in AMR is not solely to safeguard the environment but rather due

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## Article info

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to the potential for microbes and their genetic material to readily transfer among humans, animals, and the environment. This facilitates enhanced possibilities for the dissemination and development of resistance. The environment harbors a wide array of newly discovered bacterial resistance genes developed over millions or billions of years. Certain genes have the ability to become mobile and migrate to human and animal pathogens that were previously vulnerable through a process called horizontal gene transfer. This phenomenon can give rise to the development of novel drug-resistant diseases that have the potential to rapidly propagate and trigger pandemics (Larsson et al., 2023). AMR is estimated to result in approximately 10 million fatalities per year by 2050 (Tang et al., 2023).

The one-health approach suggests three pathways for change: 1) Policy, legislation, advocacy, and financing; 2) Organizational development, implementation, and sectoral integration; 3) Data, evidence, and knowledge. In India, the National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017-2021 (World Health Organization, 2017) is a comprehensive approach to fight AMR targeting human and non-human sectors. The plan strategizes six priority areas: Improving awareness, strengthening evidence and knowledge, reducing incidences of infections, optimizing usage, promoting investments, and enhancing collaboration. However, the ever-changing healthcare paradigm and the evolution of newer infections like COVID-19, where antimicrobials were used irrationally, led to the emergence of newer concerns (Kumar et al., 2021). Additionally, active pharmaceutical ingredients were detected in Indian rivers, posing public health risks. Against the growing concern about AMR and its importance in the action plan of G20, this letter would like to bring a call for action to strategize and implement NAP-AMR 2.0.

The NAP-AMR has taken positive steps to tackle the challenge of AMR within India. For instance, legislative measures like banning various fixed-dose combinations and colistin, establishing antibiotic residue standards, and implementing revamped schedule H1 policies restricting the over-the-counter sale of antibiotics. However, the state-level action plans were implemented only in Indian states: Kerala, Delhi, and Madhya Pradesh. Kerala is one of India's few states that has successfully limited the sale of over-the-counter (OTC) antibiotics and self-medication. In some places, the adoption and enforcement of the Schedule H1 laws have been delayed, with no reduction in the use of non-prescription OTC antibiotics. This is owing to weak regulatory enforcement by drug inspectors and limited capacity; there is a need for additional action to close any remaining gaps. This requires ongoing commitment from all major stakeholders, including government agencies, healthcare practitioners, the pharmaceutical industry, and the general public (Nair et al., 2021).

## Priority Areas that Must be Addressed

Given the current situation and the current strategic areas, we propose three priority areas that must be addressed while adopting NAP-AMR 2.0.

First, *Regulatory Reforms*. The Drug and Cosmetic Act 1940 and its associated rules govern medicine dispensing regulations in India. However, these regulations have little impact, as pharmacies often lack systems to monitor essential factors such as the validity of prescriptions, the intended recipient of medication, and the associated medical condition. Once the prescription is returned to the patient, pharmacists are left with minimal evidence beyond the drug quantity record. For example, antibiotics are dispensed for inappropriate prescriptions or over-the-counter, as no strict regulations or stewardship programs are in place.

Additionally, online pharmacies are not subject to any comprehensive law or legislation in India, including the Drug and Cosmetics Act. Only the e-commerce aspects of online pharmacies fall under the Information Technology Act 2000. Therefore, medicine dispensing through e-pharmacies is not monitored or regulated. Despite being a foundational framework, India's pharmaceutical regulation is incapable of accounting for the emerging healthcare landscape and consumption practices.

The draft of the new Drugs, Medical Devices, and Cosmetics Bill 2022 ([Ministry of Health and Family Welfare India, 2022](#)) and the National Medical Commission Registered Medical Practitioner (Professional Conduct) Regulations, 2023 ([National Medical Commission, 2023](#)) are positive developments that have the potential to significantly improve the regulation of the healthcare sector in India. But, considering the changing paradigm of healthcare, the regulations shall focus on the demand side (i.e., the consumers or patients) in addition to the awareness and restrictions applied on the supply side. Health ecosystems must provide opportunities and support for consumers to make responsible consumption decisions. Without appropriate regulations and monitoring, health ecosystems create numerous opportunities for people to consume medicines irresponsibly. Unless there is proper surveillance on the implementation of these regulations, the efforts may be futile.

Second, *Focus on Environmental Transmission Pathways*. Reducing antibiotic consumption is an essential part of the fight against AMR. However, it is not sufficient on its own. Other measures are also needed to reduce the spread of resistant strains and resistance genes. Given that the environment is a major reservoir and channel for AMR transmission through human exposure to food and water, our efforts should focus on reducing the drivers of environmental



AMR. The finding that sanitation infrastructure is a better predictor of AMR infections globally than antibiotic use data suggests that we need to focus more on environmental transmission pathways (Larsson et al., 2023). NAP-AMR 2.0 shall stress improving sanitation and hygiene, improving access to clean water, and limiting the use of antibiotics in aquaculture and agriculture.

Further, there is a need to address the problem of inappropriate medicine disposal and the active pharmaceutical ingredients reaching the waterbodies, raising concerns. A targeted eco pharmacovigilance (Kaladharan et al., 2023) must be considered a priority area in the upcoming NAP-AMR 2.0. The Swachh Bharat Mission could collaborate with other sectors, such as the healthcare, pharmaceutical, and waste management industries, to develop and implement comprehensive environmental AMR control programs.

Third, *Leveraging technology for Stakeholder Partnerships*. Fighting AMR requires intense stakeholder partnerships to co-create and implement the plans. The Indian healthcare sector has recently undergone revolutionary changes with the emergence of (ABDM), which provides an integrated digital health infrastructure facilitated through a unified health interface. The health ecosystem provides each citizen with a unique health ID that allows them to access their health-related information on interoperable platforms, such as prescriptions, lab reports, and physician reports (National Health Authority, 2022). NAP-AMR shall make use of these interoperable technologies to facilitate stakeholder partnerships. The novel technology-based platform shall be utilized to communicate and coordinate NAP-AMR activities, which ensure transparency and visibility. This platform could allow stakeholders to share data on AMR trends, best practices, and funding opportunities. This would enable stakeholders to better understand the AMR problem and develop more evidence-based, effective solutions. Capacity building is a barrier to the effective implementation of AMR mitigation strategies, and innovative measures like ABDM can provide resources, real-time data, and online resources to empower the NAP-AMR actors to make informed decisions with expert consultation. Also, the technology enables the health systems to keep track of antibiotic dispensing and usage and thus tailor interventions accordingly.

## Implications to Global Healthcare Systems and Policies

Collaborative initiatives with other countries can considerably improve knowledge exchange and coordination, resulting in more targeted and effective responses to this global concern. India may lead global awareness campaigns, set international norms, and encourage research collaborations for novel antibiotics and diagnostics by using its leadership. Through training programs and best-

practice exchanges, these collaborative efforts can also prioritize capacity building, particularly in low- and middle-income countries. Promoting regional action plans that address specific AMR concerns unique to each area and community engagement adapted to local settings can help ensure actions are culturally relevant and effective. Enhanced cooperation can help build solid worldwide networks for AMR surveillance and response, coordinate regulations, and develop a unified global framework. This joint activity has the potential to result in more cost-effective AMR interventions, reducing the economic load on healthcare systems while also improving health outcomes by lowering morbidity and mortality from resistant infections. Overall, India's G20 Presidency has the potential to greatly advance global efforts against AMR, resulting in a more resilient and coordinated international health system.

## Conclusion

The call for action to implement NAP-AMR 2.0 in the context of India's G20 Presidency represents a critical and timely initiative. AMR poses a global threat that transcends borders and domains of health and the environment. The proposed priority areas of revamping regulations, focusing on environmental transmission pathways, and leveraging technology for stakeholder partnerships emphasize the issue's interconnectedness. By focusing on the priorities outlined, India can take the lead in combating AMR domestically and make a significant contribution to the global fight against this pressing public health threat.

## Keywords

India; antimicrobial resistance; national action plan; pharmaceutical regulations; one health approach

### Declaration of Conflicting Interest

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### Authors' Contributions

Sanju K: Conceptualization and writing. Dhanya M: Conceptualization, Review and Supervision. All authors approved the final version of the article.

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#### Data Availability Statement

Not applicable.

#### Declaration of the Use of AI in Scientific Writing

We, the authors, declare that AI tools were used for grammar checking in the writing process to enhance the clarity, coherence, and overall quality of the writing.

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